

P001 067 US/HG

## Claims:

- 5 ~~1.~~ A mobile telecommunications network including an <sup>10</sup> access network portion and a core network portion, wherein said access network portion includes an <sup>20</sup> access control part arranged to communicate with said core network portion over a <sup>(102) 105?</sup> predetermined licensed mobile network interface, wherein said access network portion further includes <sup>U<sub>m</sub></sup>
- 10 at least one base station part arranged to communicate with mobile terminals over an <sup>104</sup> unlicensed radio interface and
- 15 <sup>PS 9</sup> a <sup>106</sup> fixed broadband network connecting said access control part and said at least one base station part, wherein said access network portion is arranged to relay upper layer messages between a mobile terminal and said core network portion in a transparent manner over said unlicensed radio interface.
- 20 2. A network as claimed in claim 1, wherein said upper layer messages include mobility management messages and above.
3. A network as claimed in claim 1, wherein said unlicensed radio interface uses broadband radio.
- 25 4. A network as claimed in claim 1, wherein said unlicensed radio interface is a Bluetooth interface.
- 30 ~~5.~~ An access network adapted to communicate with mobile terminals over an unlicensed radio interface and with a core network portion over a predetermined mobile network interface, wherein at least upper layer messages exchanged between said mobile terminal and said core network

are relayed substantially transparently over said unlicensed radio interface and through said access network.

5 6. An access network as claimed in claim 5, wherein said unlicensed radio interface uses broadband radio.

7. An access network as claimed in claim 5, wherein said unlicensed radio interface is a Bluetooth interface.

10 ~~8.~~ A base station for use as part of an access network arranged to communicate with a core network portion of a public mobile telecommunications network, wherein said base station is adapted to communicate over an unlicensed radio interface with at least one mobile terminal and to communicate through a fixed broadband network with an access control part of said access network connected to said core network, wherein said base station is arranged to relay messages transmitted between said mobile terminal and said core network transparently over said unlicensed radio interface and through said fixed network.

15 20 9. A base station as claimed in claim 8, further including a first interface module for relaying upper layer messages over said unlicensed radio link and a second interface module for relaying said upper layer messages over said fixed network, said first and second interface modules being arranged to transfer upper layer messages between one another substantially transparently.

25 10. A base station as claimed in claim 8, wherein said second interface module is arranged to relay upper layer messages over an IP-based fixed network.

30 ~~11.~~ An access network controller for use as part of an access network arranged

to enable communication of a mobile terminal with a public mobile telecommunications network through an unlicensed radio interface, wherein said access network controller is arranged to communicate with a core network portion of said public mobile telecommunications network over a predetermined licensed mobile network interface and is further connected to a fixed broadband network for communication with mobile terminals through at least one base station, wherein said access network controller is arranged to transmit and receive upper layer messages exchanged with mobile terminals in a transparent manner over said fixed broadband network.

12. An access network controller as claimed in claim 11, further including an interface module for relaying upper layer messages over said fixed network.

13. An access network controller as claimed in claim 12, wherein said fixed broadband network is an IP-based network, wherein said interface module is arranged to relay upper layer messages through an IP protocol tunnel.

14. An access network controller as claimed in claim 11, wherein said fixed broadband network is an ATM-based network.

15. An access network controller as claimed claim 11, further including a register for mapping the location of mobile terminals to a base station, wherein said register is arranged to be accessible on receipt of a paging request from said core network to a mobile terminal to determine a base station able to communicate with said mobile terminal.

~~16.~~ A mobile telecommunications network including an access network portion and a core network portion, wherein said access portion includes a

plurality of base station systems for communicating with mobile terminals over a licensed public mobile network air interface, said base station systems being arranged to communicate with said core network portion over a predetermined mobile network interface, wherein said network includes at least one local base station system arranged to communicate with said core network portion over said predetermined mobile network interface and further adapted to communicate with mobile terminals over an unlicensed radio interface, wherein said local base station system is arranged to relay upper layer messages between said mobile terminals and said core network substantially transparently.

17. A network as claimed in claim 16, wherein said local base station system includes at least one local base station for communicating with mobile terminals over said unlicensed radio interface and a local base station controller connected to said at least one local base station and adapted to communicate with said core network portion over said predetermined network interface.

18. A network as claimed in claim 17, wherein said local base station is connected to said local base station controller through a fixed broadband network.

19. A network as claimed in claim 18, wherein said fixed network is an IP-based network, and upper layer messages exchanged between said mobile terminals and said core network portion are relayed between said local base station and said local base station controller by tunnelling through said IP-based network.

20. A network as claimed in claim 18, wherein said fixed network is an ATM-

based network.

21. A network as claimed in claim 16, wherein said unlicensed radio interface uses broadband radio.

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22. A network as claimed in claim 16, wherein said unlicensed radio interface is a Bluetooth interface.

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~~23.~~ A mobile terminal for communicating with a mobile telecommunications network including an access network portion and a core network portion, said terminal including a communication management module for generating upper layer messages for, and receiving upper layer messages from, said core network, a first interface module for establishing a licensed public mobile network radio link with said access network portion and relaying said upper layer messages to and from said communication management module, wherein said terminal further includes a second interface module for establishing an unlicensed radio link with a modified access network connected to said core network, wherein said second interface module is arranged to relay said upper layer messages over said unlicensed radio link when said mobile terminal is connected to said modified access network.

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24. A mobile terminal as claimed in claim 23, wherein said second interface module is arranged to relay said upper layer messages between said communication management module and said core network portion over said unlicensed radio link in a transparent manner.

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25. A mobile terminal as claimed claim 23, wherein said unlicensed radio interface uses broadband radio.

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26. A mobile terminal as claimed in claim 23, wherein said unlicensed radio interface is a Bluetooth interface.

27. A method of connecting a base station as claimed in claim 8 with an access control part of an access network over a fixed broadband network, said method including the steps of :

establishing a connection with a first port of the access control part on said fixed network,

sending an attachment request to said first port including a first predetermined device identifier,

receiving a request acknowledgement including a connection interface address on said fixed network and a base station identifier,

releasing said connection with said first port,

establishing a connection at said fixed network interface address using said base station identifier.

28. A method as claimed in claim 27, further including the step of:

sending a connection maintenance message to said received interface address within a predetermined time interval to maintain said connection established.

29. A method as claimed in claim 28, further including step of:

receiving said time interval from said access control part with said request acknowledgement.

~~30.~~ A method of registering a base station that is adapted to communicate with mobile terminals through an unlicensed radio link with an access network controller that provides access to a core network of a public mobile telecommunications network through a fixed network interposed between said base station and said access network controller, said method including

the steps of:

receiving a connection request including an unlicensed radio device

identifier from said base station through said fixed network,

authenticating said unlicensed radio device identifier,

5 selecting a base station identifier and reserving at least one communication

port on said fixed network for communication with said base station,

transmitting a response to said connection request including an interface

address for said reserved port and said base station identifier,

checking for said base station identifier in communication requests through

10 said interface address and reserved port prior to permitting communication.

31. A method as claimed in claim 30, further including the steps of:

communicating a connection maintenance time interval to said base

station, and releasing said reserved port if a connection is not established

15 within said time interval.